



# HEALTHY EYES

Information for patients

“Therapy Active – Living with Diabetes” is a treatment programme for patients with type 2 diabetes mellitus. Ask your doctor about it!

Contact:  
[office@therapie-aktiv.at](mailto:office@therapie-aktiv.at)  
[www.therapie-aktiv.at](http://www.therapie-aktiv.at)



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For the purpose of legibility, any gender-specific terms refer to both men and women equally.



Type 2 diabetes

Disease Management Programm



# WHAT CAN I DO FOR HEALTHY EYES DESPITE MY TYPE 2 DIABETES?

More and more people suffer from type 2 diabetes; among them, many young people. One of the long-term consequences of the condition is eye damage. If a person with diabetes is not diagnosed and treated at an early stage, this can lead to serious problems.

So don't let it come to that! The more you actively do for your health, the more favourable the course of the disease. You should take the following points to heart:

## A balanced diet

The range of foods in your diet should include lots of fresh fruit, vegetables and whole grain products, and a modest amount of animal-derived foods. Try to steer clear of foods that are high in fat and sugar. Drinking enough is vital – ideally sugar-free!

## Enough exercise

Get active and gradually increase the amount of physical activity in your day. Consult with your doctor to decide which type of sport and intensity level would be best for you.

## Body weight

A balanced diet and enough exercise will help you lose weight and keep it off. It is important to keep your calorie intake lower than your calorie expenditure. You can achieve this with a balanced diet that is low in fat and high in fibre, and by controlling your portion sizes.

## Quit smoking

Start your new, smoke-free life today. Your doctor will be glad to help you become a non-smoker.

## Take your pills regularly

If you have been prescribed medicine to reduce high blood sugar, it is vital that you take it regularly.

## Diabetes training

In the diabetes training you will learn everything you need to know about diabetes, enabling you to take charge of your own health.



# WHAT TO EXPECT AT YOUR EYE EXAM

## Vision test

This test uses an eye chart. You will be 5 to 6 m away from the chart. First your vision is tested without and then with the best possible corrective lenses. Each eye is tested separately, for both far- and short-sightedness.

## Examination of the front section of your eye

Your eyelid, sclera, cornea, iris and lens are examined by means of a slit lamp, which focuses a high-intensity light source through a slit. A special attachment also makes it possible to measure your eye pressure. The slit lamp looks like a microscope with two oculars.

## Examination of the eyeground (ophthalmoscopy)

This examination is carried out on widened pupils (mydriasis) to allow for better inspection of the outer parts of your retina. The vitreous humour, optic nerve, macula, blood vessels and retina are examined, using either - a special magnifying instrument, or - a hand-held lens.

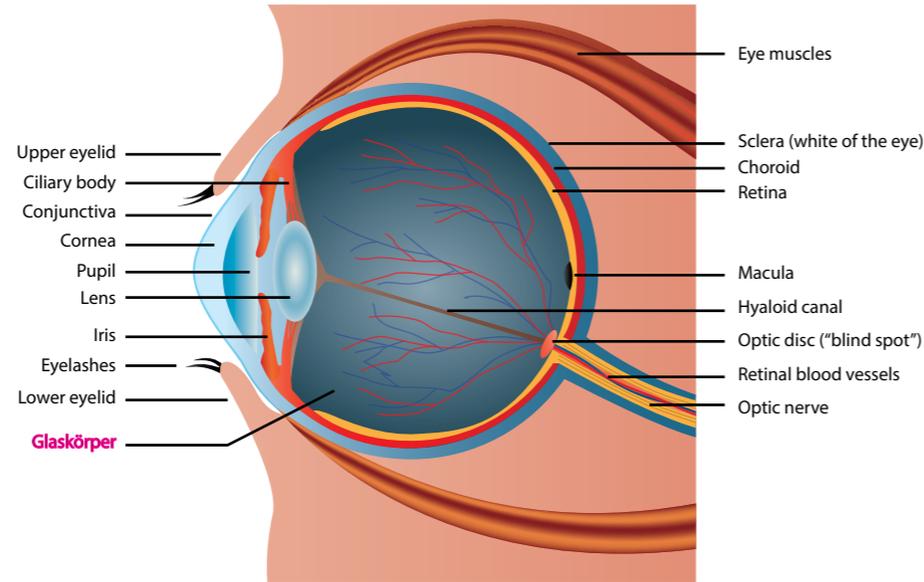


If you notice any changes in your vision, please contact your doctor immediately. Have your eyes checked at least once a year!

# THE EYE

The eye allows us to see the people and things around us, to quickly identify dangers, and to move safely through our surroundings. Light that is reflected in our surroundings is sent through our cornea, the anterior chamber of our eye, our pupil, lens and vitreous humour to our retina. From there the collected light signals are transmitted via the optic nerve and the visual pathway to the brain, where the image is formed.

High blood sugar levels can damage the tiny blood vessels in the retina.



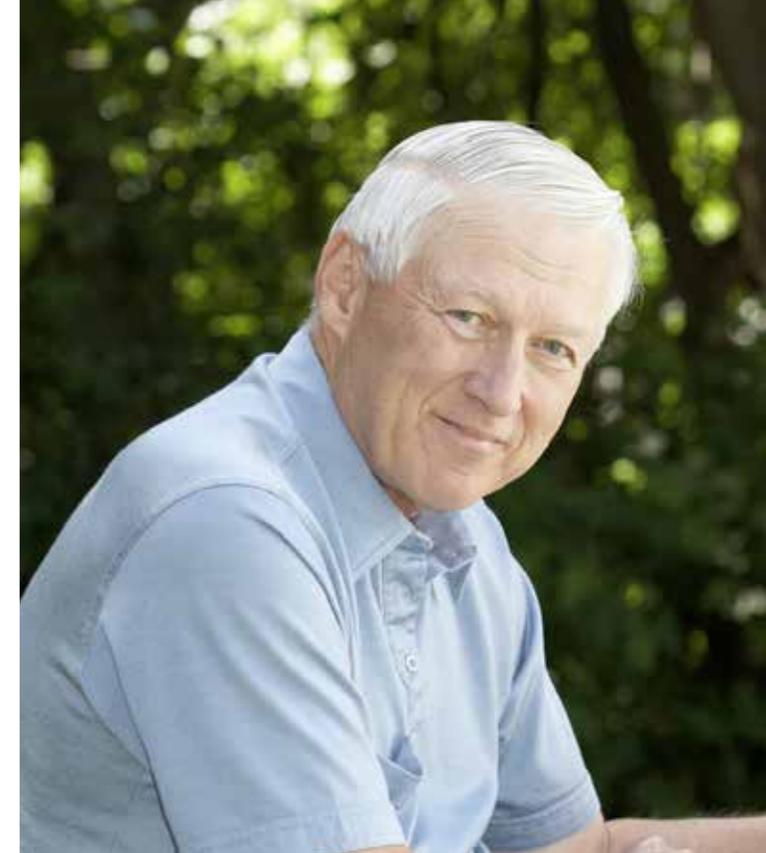
## FURTHER ADVERSE FACTORS:

- ... Attendant high blood pressure
- ... Long-term diabetes
- ... Hormone changes (puberty, pregnancy)
- ... Smoking
- ... Strong fluctuation in blood sugar levels
- ... High blood lipid levels

This poses a threat to your vision. Potentially harmful changes often go unnoticed for a long time. In order to detect them at an early stage, "Therapy Active – Living With Diabetes" attaches great importance to regular eye check-ups.

# HOW CAN I HELP MYSELF?

- ... Go for an eye check-up **once a year**. If you are already experiencing eye trouble, your eye specialist will want to see you more often.
- ... If you notice any **changes in your vision**, contact your "Therapy Active" doctor immediately.
- ... Refrain from **smoking**.
- ... See to it that you have a **good metabolism**, i.e. **good blood sugar and blood pressure levels**.
- ... Get physically active – **exercise** helps you keep your blood sugar levels under control. **Please note:** if you are already suffering from retinopathy, you should avoid high-intensity sports. Consult with your "Therapy Active" doctor to decide which sport, duration and intensity is best for you.
- ... Take your **medicine regularly**.
- ... If your **blood sugar level is constantly high**, you could experience fluctuations in your vision. This may especially be the case when you are just starting on your insulin treatment. For this reason, we recommend that you only get yourself tested for **new glasses** once your blood sugar level has stabilised. If you are experiencing serious diabetes-related fluctuations in your vision, please do **not drive**.



A patient's statement:  
 "I regularly go for eye exams –  
 for the sake of my vision."



An annual eye check-up is part of the "Therapy Active" programme.

# WHAT COULD HAPPEN?

## Diabetic retinopathy

Diabetic retinopathy is one of the most common causes of blindness in adults. It can occur in people suffering from either type 1 or type 2 diabetes. There are different kinds of diabetic retinopathy:

### Nonproliferative retinopathy

Initially, the retina is not supplied with enough blood. This circulation problem results in bulges (microaneurysms) that can burst and leak blood into the retina. At the same time, fluid, fats and proteins can enter the retina. As long as the macula (central section of the retina) is not affected, you shouldn't have any discomfort.

### Proliferative retinopathy

If the disease progresses, new blood vessels (proliferations) grow, trying to counter the bad blood supply. These are, however, not stable and can easily burst. They can grow into the retina, bleed or leak, and even enter the vitreous humour and leak blood into it. The scar tissue formed from residue blood may cause the retina to detach from the back of the eye. If the iris is affected, this may cause glaucoma. Proliferative retinopathy usually leads to permanent damage or even loss of eyesight.



Early stage of diabetic retinopathy



Advanced stage of diabetic retinopathy



Late stage of diabetic retinopathy

## SYMPTOMS

At first, diabetic retinopathy tends to go unnoticed. Symptoms only start to occur in the advanced stage.

- ... People affected by the condition have blurred vision.
- ... If blood is leaking into the vitreous humour, they see dark spots, also known as floaters.
- ... Vision loss generally progresses slowly, but can also occur suddenly in the case of larger lesions or retinal detachment.

## Treatment

- Good blood sugar levels
- Treatment of other risk factors such as high blood pressure, diabetic kidney disease, high blood lipid levels
- No smoking
- **Laser therapy:**  
This therapy, which corrects the affected areas in the eye using laser technology, is done under local

anaesthetic. Although it can slow the progression of diabetic retinopathy, it may result in some loss of peripheral or night vision.

- **Surgery:**  
Surgery is necessary in the case of retinal detachment or blood leakage into the vitreous humour.



Because fluctuations in your blood sugar levels may also be reflected in your vision, you should only get fitted for new glasses once your blood sugar levels are stable.

## Macular oedema

The macula, the “yellow spot”, is the central area of the retina. This is where most of the eye’s sensory cells are located. The macula allows us to see colours and to focus e.g. when reading or recognising faces.

If the macula has already been affected, fluid accumulates inside it, causing it to swell and stop functioning properly. This results in severe vision deterioration.

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- ... This results in severe vision deterioration.

### Treatment

- Good blood sugar levels
- Treatment of other risk factors like high blood pressure, diabetic kidney disease, high lipid levels

- No smoking
- **Intravitreal injection** of anti-angiogenic drugs: Substances that counteract the growth of new, harmful blood vessels are injected directly into the eye. Another injection is given only if significant loss of vision is again determined at one of your monthly check-ups.
- **Laser therapy:**  
The goal of laser therapy is to activate the membrane under the retina and the immune system in order to reduce swelling, and also to remove those parts of the retina with bad blood flow, thereby reducing oxygen demand.
- **Corticosteroids**  
Some patients experience an improvement in their eyesight after an injection with these substances. However, it is connected with a higher risk of glaucoma and cataract.
- **Surgery:**  
In some cases, when the vitreous humour is putting pressure on the centre of the retina, causing it to swell, the best therapy is the surgical removal of the vitreous humour (vitrectomy).



Normal vision



Vision with macular oedema

## Ischaemic maculopathy

Blockage of the blood vessels leads to a lack of oxygen and therefore to a loss of photoreceptor cells in the macula. Contrary to a macular oedema, the loss of vision associated with ischaemic maculopathy is not treatable.



A stable blood sugar level is essential to preventing eye diseases.



Keep an eye out for any symptoms!

## Cataract (clouding of the lens)

People with diabetes are at higher risk of developing cataracts. These occur more often and earlier in diabetics. A cataract is a clouding of the lens. It consists mainly of water and protein, which, if it clots, leads to grey-white build-ups in the lens. This results in foggy vision.

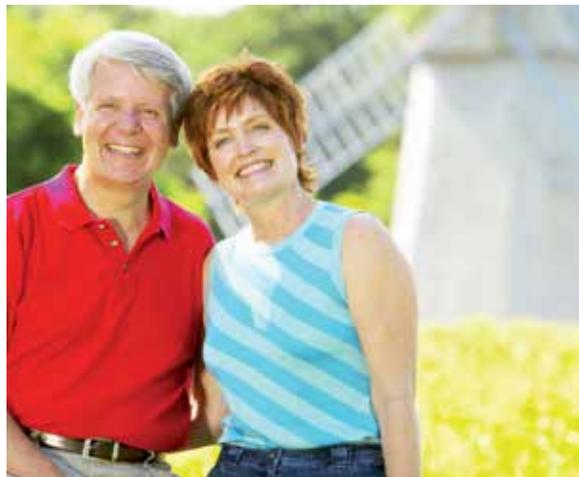
Cataracts usually form gradually. The attendant slow deterioration in vision often goes unnoticed. From the age of 65, a certain degree of clouding is normal. But age is not the only cause of cataracts, as some people have them from birth.

### SYMPTOMS

- ... Patchy or foggy vision
- ... Bad night vision
- ... Glare around bright light sources
- ... Light sensitivity and problems with glare

### Treatment

Cataracts are treated surgically. The cloudy lens is removed and replaced with a customised artificial lens. Cataract surgery is an efficient way of restoring vision.



Normal vision



Vision with cataracts

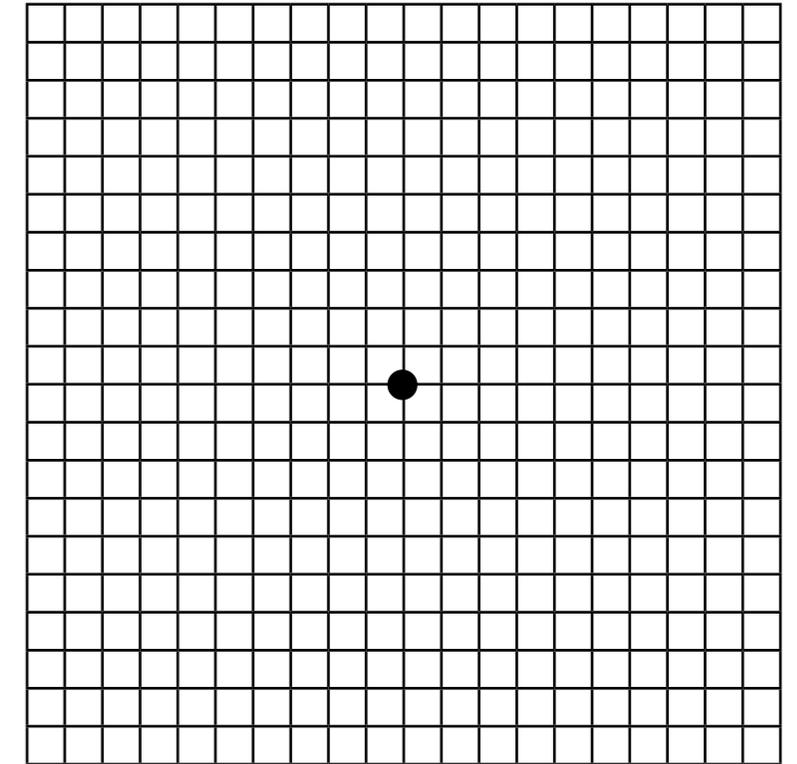
## THE AMSLER GRID TEST

You can use the Amsler grid to determine whether you have distorted or blurry vision (self-test).

### How the test works:

Hold the grid about 30 or 40 cm away from your eyes and look at it in daylight. If you normally use reading glasses or contact lenses, wear them for the test. Carry out the test on each eye individually.

- Cover one eye, but be sure not to squeeze it shut.
- With the other eye, focus on the black spot in the middle of the grid. What do you see? Now swap eyes and repeat.



### If you observe any of the following, you should consult your eye doctor:

- Do some of the squares in the grid look bigger or smaller than the others?
- Is the grid missing a corner?
- Are there any empty spaces?
- Are some lines distorted or wavy?
- Are certain sections of the grid blurred?
- Do you see a grey shadow?

